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# High Throughput Method Development for PAHs Using the Agilent 1290 Infinity LC System and a ZORBAX Eclipse PAH Column

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Due to the mutagenic and carcinogenic properties of polycyclic aromatic hydrocarbons (PAHs), the determination of these analytes is an important field in environmental analytical chemistry. Environmental laboratories around the world are faced with an ever increasing demand to speed up their methods and increase the sample throughput.

This application note shows the result of the development of a very fast method for the separation of 16 polycyclic aromatic hydrocarbons (PAHs) with the Agilent 1290 Infinity LC system. The developed method, which uses acetonitrile as mobiles phase, separates the PAHs in less than 3 min. Due to the high price of acetonitrile, a method based on methanol for the same separation was developed. Both methods are compared and discussed.

## Experimental

### LC system

For PAH method development, an Agilent 1290 Infinity LC system was used. The system is comprised of: 1290 Infinity Binary Pump with integrated degasser, 1290 Infinity High Performance Autosampler, 1290 Infinity Thermostatted Column Compartment, 1290 Infinity Diode Array Detector. Column: ZORBAX Eclipse PAH 2.1 × 50 mm, 1.8 µm.

### PAH (EPA) mixture

The EPA mixture of Polycyclic Aromatic Hydrocarbons is a certified reference material from Sigma-Aldrich (Catalog No. 4-7940-U) diluted in acetonitrile. Each PAH has a concentration of 10 µg/mL in the mixture.

## Results and Discussion

Figure 1 shows the optimized separation of sixteen EPA PAHs on an Agilent ZORBAX Eclipse PAH column within 3 min using acetonitrile as organic modifier in the mobile phase.

Figure 2 shows the baseline separation of 16 EPA PAHs on an Agilent ZORBAX Eclipse PAH column within 6 min using methanol as organic modifier in the mobile phase.

## Conclusion

We showed that the Agilent 1290 Infinity LC system is very suited to develop fast HPLC methods. The separation of 16 EPA PAHs succeeded in 3 and 6 min by using acetonitrile and methanol as organic modifiers in the mobile phase, respectively. For example, per 1000 PAH samples, either a volume of 2.0 L for acetonitrile and a pure analysis time of 50 h or a volume of 3.8 L for methanol and a pure analysis time of 100 h are necessary.

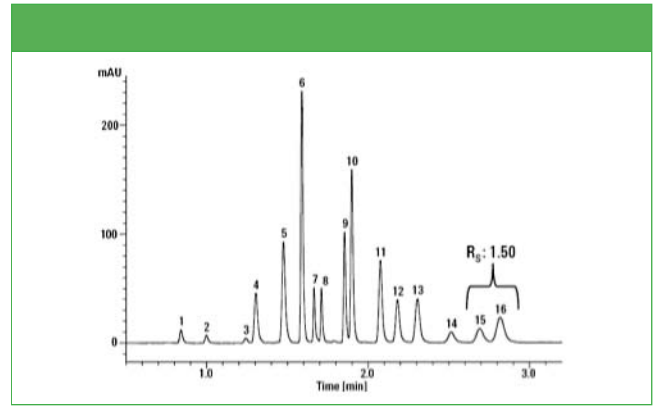


**Figure 1:** Separation of PAH (EPA 16) mixture. Chromatographic conditions: Mobile phase: A: water, B: acetonitrile; Flow rate: 0.9 mL/min; Detection: UV, 254 nm; Injection volume: 1 µL; Temperature: 30 °C; Pressure drop: 585 bar; Gradient: 0.00 min 45 %B, 1.26 min 62 %B, 1.52 min 90 %B, 3.00 min 90 %B.

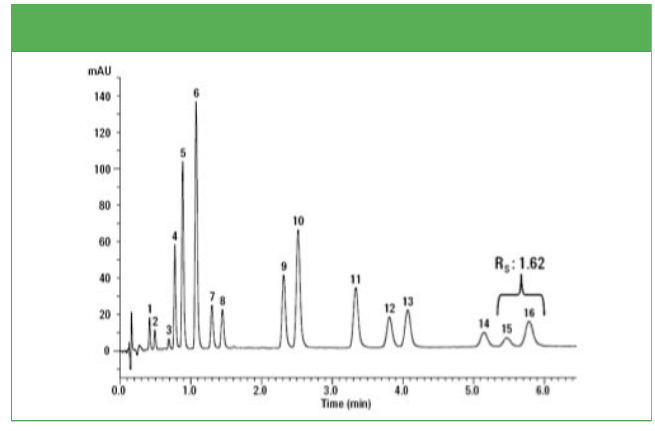


**Figure 2:** Separation of PAH (EPA 16) mixture. Chromatographic conditions: Mobile phase: A: water, B: methanol; Flow rate: 0.75 mL/min; Detection: UV, 254 nm; Injection, volume: 1 µL; Temperature: 39 °C; Pressure drop: 593 bar; Gradient: 0.00 min 75 %B, 1.62 min 85 %B, 2.75 min 85 %B, 6.00 min 90 %B.

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